Buildings Technology Research and Development Subcommittee Meeting

November 23, 2010

Location: 950 L'Enfant Plaza DOE
Time: 1:30-3:30 p.m.

Attendees[1]	**Agency/Office**
Shyam Sunder	DOC/NIST BTRD Co-chair
Roland Risser	DOE/EE-Buildings BTRD Co-chair
Kevin Hurst	EOP/OSTP
William Grosshandler	DOC/NIST
Paul Domich	DOC/NIST BTRD Ex-Sec
George Hernandez	DOE/EE-Buildings/PNL
Greg Liefer	HHS (speaker)
Aurora Sharrard	Green Building Alliance (speaker)
Bruce Hunn	ASHRAE (retired) (speaker)
Alan Schroeder	DOE/EE-Buildings
Kurt Knight	VA
Dale Manty	EPA
Diane Stewart (telephone)	HHS
Ted Kozak	HHS
Joni Teter	GSA
Judith Heerwagen	GSA
Kinga Porst	GSA
Amber Van Amburg	GSA
Echton English	NSA
Ilker Adiguzel	USACE
Marty Savoy	USACE
Sarah Ryker	STPI
Chris Weber	STPI
John Taggart	STPI
Unknown	U.S. Postal Service

Next Meeting: December 16, 2010 1:30 - 3:30 PM, 950 L'Enfant Plaza DOE

Meeting Calendar:

January 20, 2011	July 21, 2011
February 17, 2011	August 18, 2011
March 17, 2011	September 15, 2011
April 21, 2011	October 20, 2011
May 19, 2011	November 17, 2011
June 16, 2011	December 15, 2011

[1] Active Members not attending identified in light gray

Introductions: Acting BTRD Chair, William Grosshandler (NIST) opened the monthly meeting of the Subcommittee for Buildings Technology Research and Development (BTRD) welcoming the agency representatives and thanking them for their participation. Participants provided self-introductions.

Review of Minutes: Minutes were reviewed prior to the start of the meeting.

DASH - Database for Analyzing Sustainable and High Performance Buildings: Guest speaker Aurora Sharrard of the Green Building Alliance provided an overview of DASH. The DASH program is intended to facilitate consistent collection of measureable data about green, sustainable, and high performance buildings through collaboration of existing building information databases, organizations, companies, and researchers. The DASH concept was first discussed in 2004 at the Greenbuild conference in Atlanta. Over the next ten years, the program has, despite incremental funding, outlined the basic framework for the program and orchestrated collaboration with a number of strategic partners.

The goal for DASH is to collect and disseminate standardized data for both standard and high performance buildings. Currently, building data is incomplete, dispersed across a number of different entities, regionally focused, and/or lacking standards for data conformity that enables analysis. Methods for collecting data are consistent between tools, making comparisons difficult. The DASH program seeks to develop a central repository for buildings data, using common and agreed upon performance metrics, and standardizing the data and data collection tools and protocols. To be successful, the approach must be endorsed by all major partners and stakeholders.

DASH will provide a building reporting/monitoring tool specifically for owner/operators and facility managers, and a user-friendly analysis portal for architects, contractors, and researchers. Such a tool will serve to better quantify building performance and will enhance the monitoring of building activities. Quality assurance (QA) metrics will be included that ensure that data is of adequate accuracy and integrity. In addition, data will need to be scrubbed and manually verified. The primary users for the system will be building professionals, and as such, good levels of cooperation are expected in managing the QA issue. The DASH system, once developed, intends to incorporate data from other existing sources such as ENERGYSTAR Performance Manager, and others.

Stakeholders who expect to benefit from include:

- Real Property Industry: Decision makers, Developers, Investors, Property management firms, Owner/operators
- Consultants, Services & Products: Architects, Engineers, Contractors, Specifiers, Facility managers, Product/technology developers, Energy advocacy groups

- Researchers & Analysts: Colleges, Universities, Nonprofits, Government agencies, National Laboratories

The Green Building Alliance and the American Society of Heating, Refrigerating & Air Conditioning Engineers represent the primary partners in this effort. The DASH Consortium includes:

- ASHRAE American Society of Heating, Refrigerating, & Air Conditioning Engineers
- BOMA Building Owners and Managers Association
- CBECS Commercial Buildings Energy Consumption Survey
- DOE Department of Energy
- EPA Environmental Protection Agency
- GBA Green Building Alliance
- GSA General Services Administration
- IFMA International Facility Management Association
- McGraw-Hill Construction
- OSCRE Open Standards Consortium for Real Estate
- USGBC U.S. Green Building Council

To date, the DASH program remains as a conceptual framework - no data has been collected nor standards developed for data and data collection protocols. The DASH program development will begin with a regional program developed in close collaboration with stakeholder groups and then rolled out to a national level.

The DASH tool itself will be a standard Web interface reporting tool based on measure lists and protocols and will be developed using several ad hoc focus group scenarios. The initial development period is expected to be 12 months. The interface will be tailored to three different user communities based on their data needs and requirements – generally categorized upon the data resolution required and whether a single or multiple buildings are being reported or analyzed.

Metering – Approach and Lessons Learned: Greg Leifer (NIH) provided a presentation on the metering and submetering project undertaken at the National Institutes of Health. Greg presented an overview of the elements and factors that impacted the success of the project. The metering project began over ten years ago and is now fully functional system. Originally, only main meters existed for electricity and domestic water, none for steam or chilled water.

The NIH site consists of 325 acre Campus with rough 60 buildings, 10,000,000 square feet of space. The campus is comprised of diverse functions from hospitals to research labs, and industrial and office buildings. Utilities are provided by a central/district for heating & cooling, chilled water and compressed air - water and electricity are supplied by local municipal utilities. NIH has a co-

generation plant on the campus for producing a significant portion of their energy needs.

The summary of the high-level elements needed for success include:

- The pathway to metering success starts with a fundamentally sound system of HW and SW
- Properly operating metering
- Properly operating communications
- Properly operating database
- Properly operating reporting
- Proper maintenance (equipment and data systems)
- Effective Troubleshooting

Key issues to address in the project were which buildings and systems were consuming large amounts of resources; what was the existing infrastructure designed for, verses, what level of capacity was being used; and what documentation existed on the infrastructure currently in place. NIH benefited from an existing building automation/communication system (BAS) already in place and fully functioning. Only a small number of new BAS connections were needed. The BAS was used for non-electrical metering while a separate data network (LAN) was used for electricity metering.

Challenges during the project involved understanding the characteristics of the existing plant –piping layouts and diameters, and actual flows of resource and determining where and what type of water/steam meters were to be installed. Over 150 new electricity meters were installed which required selecting the appropriate the type of meter for the application and making structural changes to existing electrical infrastructure to accept the meters. Outages were required to install the meters, which in the NIH environment, necessitated that the meters be installed correctly the first time. Repeated outages were not acceptable.

Installation of the system was performed by outside contractors. Leifer stressed that qualified installers are integral to the initial success of the submetering project. Operations and maintenance staff required training in the ongoing maintenance of the system, which initially was unfamiliar to the in-house staff. Safety considerations were important to track and regular supervision during the installation required. Re-piping of the plant infrastructure was required in many instances to accommodate the installation requirements for the metering devices. Other costs to consider were:

- neter, sensors (ct/pt's, temp, press), processors,
- conduit, wire, communications
- Labor and installation costs– Mechanical modifications
- Electric, BAS controls (BAS)
- Data systems – HW & SW
- Related engineering costs
- Meter costs - electric $1.5k-$5k, memory, $5k install

- conduit, wire, integration, etc

For non-electrical metering, costs per meter include meter, labor, BAS

- Steam/Chilled Water – approx $21-24K
- Compressed Air - approx $10-12K
- Domestic Water - approx $10K

Leifer also mentioned that costs for meters rise unexpectedly when options are added to the base meter configuration.

NIH used both ESPCs and limited in house funds to implement the metering system at NIH.

Central to the success of the submetering implementation was a well developed metering plan that specifies needs and requirements, data and data collections systems desired, costs and benefits, risk, locations to meter, installation and O&M strategy (contracted or in-house), and availability of site documentation including loads, locations, and sizing. Also important were the specifics on the utilities to be metered and the accuracy required provides proper configuration and specification details. Finally, availability of BAS or communication networks should be assessed and included in the plan.

Submetering Report: Paul Domich (BTRD Ex Sec) reviewed the final status of the submetering report developed by the BTRD. Agency reviews are completed and modifications made to the draft report to address agency comments. The next step is to develop a cover letter from the BTRD Co-chairs addressed to the Committee on Technology Co-Chairs seeking review and approval to release publically. Domich will develop the cover letter and send to the BTRD co-chairs for review.

BTRD 2011 Activities: Kevin Hurst (OSTP) offered a brief description of three areas for the BTRD to focus in 2011. These will be developed further by Domich and circulated to the subcommittee members prior to the next meeting on Dec 16th.

Closure: Grosshandler thanked the participants for the contributions and the meeting adjourned at 3:30pm.